

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE:
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

APPLICANTS: *Li et al.*
APPL. NO.: 09/664,226 ART UNIT: 3696
FILING DATE: September 18, 2000 EXAMINER: Colbert, Ella
TITLE: Auction Management

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AMENDED APPEAL BRIEF

In response to the Notification of Non-Compliant Appeal Brief mailed February 11, 2009, we respectfully submit this Amended Appeal Brief.

Through the enclosed Petition, Applicants respectfully request a one-month extension of the date for reply to April 11, 2009. Please charge our Deposit Account No. 07-1700 in the amount of \$65.00 to cover the fee set forth in 37 C.F.R. § 1.17(a)(1). The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed, or which should have been filed herewith to our Deposit Account No. 07-1700, under Order No. EMT-001.

REAL PARTY IN INTEREST

The real party in interest is the owner of the present application, Emptoris, Inc.

RELATED APPEALS AND INTERFERENCES

No other appeals or interferences directly affect or will be directly affected by the Board's decision in the present appeal.

STATUS OF CLAIMS

The application as filed contained 53 claims, and in an amendment filed on March 22, 2004, we cancelled claim 53. Claims 1–52 remain pending, have been rejected, and are the subject of this appeal.

STATUS OF AMENDMENTS

No amendments have been filed subsequent to the Office Action mailed on September 12, 2005.

SUMMARY OF CLAIMED SUBJECT MATTER

A buyer opens a conventional auction by distributing a “request-for-quotation” (“RFQ”) to prospective suppliers. The RFQ contains a list of the items the buyer would like to purchase. In some cases, the RFQ contains additional information pertinent to the proposed transaction, such as minimum or maximum quantities, delivery dates, or standards of quality. In response to the RFQ, prospective suppliers submit bids. The buyer then chooses which of those suppliers are

to be awarded the bid. The optimal combination of suppliers, together with the list of items to be ordered from each supplier, is referred to as an “optimal award schedule.”

Were price the buyer’s sole concern, s/he would simply select the supplier offering the lowest price per item. The present invention, however, is directed toward complex transactions involving non-price considerations. For example, a supplier’s price for an item can be made to depend on the quantity of that item purchased. Or, the supplier may give one price for a bundle of disparate items, in which case it is unclear how to allocate this price among the items. In addition, the invention permits other, less clearly quantifiable factors to be considered. For example, the buyer’s purchase decision may turn on the quality of goods or the reputation of the supplier for reliability, or the supplier’s solvency. The buyer may also have internally generated policies, or business rules, that further constrain which the choice of which suppliers can be awarded a bid.

Independent claim 1 of the present invention is directed to a computer-implemented method for determining an optimal award schedule for at least partial satisfaction of a requisition.¹ Public buyer constraints are received from a buyer over a computer network,² and the buyer also provides an objective function including non-price criteria.³ The public buyer-constraints, which are representative of the requisition, are then transmitted to a set of prospective suppliers over the computer network.⁴ Prospective suppliers (also referred to as “candidate suppliers”) choose to submit bids responsive to the public buyer constraints and send those bids across the computer network for analysis by the buyer.⁵ The objective function is used to determine an optimal award schedule that includes a list of selected suppliers from the set

¹ Specification at pg. 3, ln. 9–10.

² Specification at pg. 3, ln. 14–15.

³ Specification at pg. 10, ln. 8–13; pg. 26, ln. 1–pg. 28, ln. 10.

of candidate suppliers and information indicative of the manner in which each of the selected suppliers is to satisfy (at least in part) the requisition.⁶

Independent claim 27 is directed toward a computer-readable media having encoded thereon software for determining an optimal award schedule for at least partial satisfaction of a requisition.⁷ This claim is substantively similar to claim 1.

GROUND FOR REJECTION TO BE REVIEWED ON APPEAL

The issues on appeal are: (1) whether claims 1 and 27 are unpatentable under 35 U.S.C. § 112 for lack of antecedent basis and agreement; (2) whether the formal drawings filed with the Office satisfy 37 C.F.R. § 1.121(d); (3) whether claims 1–15 and 27–41 are anticipated under 35 U.S.C. § 102(b) by U.S. Patent No. 6,260,024 to Shkedy (“*Shkedy*”); and (4) whether claims 16–26 and 42–52 are unpatentable under 35 U.S.C. § 103(a) by *Shkedy* in view of U.S. Patent No. 6,647,373 to Carlton-Foss (“*Carlton-Foss*”).

ARGUMENT

A. Rejection Under 35 U.S.C. § 112

1. Claims 1 and 27

Claims 1 and 27 were said to lack antecedent basis for the elements “subset of suppliers,” “selected suppliers,” and “selected subset of suppliers.” Claims 1 and 27 both recite a “set of suppliers,” from which a “subset of suppliers” is subsequently selected. Any “set” will inherently include a number of “subsets,” and accordingly this rejection is clear error.

⁴ Specification at pg. 3, ln. 15–16.

⁵ Specification at pg. 3, ln. 17–19.

⁶ Specification at pg. 3, ln. 19–21; pg. 25, ln. 27–pg. 26, ln. 3.

The claims were also said to lack agreement for use of both “selected suppliers” and “selected supplier.” A selected “subset of suppliers,” like any set, may include any number of suppliers. When one supplier is claimed, the claims use the singular form; when more than one supplier is claimed, the claims use the plural form. This rejection is also clear error.

B. Rejection Under 37 C.F.R. § 1.121(d)

1. Drawings 6, 8–14, 15A, 15B, 16A, 16B, 17, 19, 20A, 20B, and 21–28

Corrected drawings were requested because “in fig.’s 6, 8-14, 15A, 15B, 16A, 16B, 17, 19, 20A, 20B, and 21-28 the shaded portion of the drawing figure’s are not legible. The shading needs to be removed in order to read the text in the drawing figures.” Office Action at 3.

Copies of Figures 6, 8–14, 15A, 15B, 16A, 16B, 17, 19, 20A, 20B, and 21–28 were obtained from the formal drawings filed on August 26, 2002, using the Office’s PAIR system and are attached to this Brief as Exhibit A. Each of these figures bears the stamp of the Office of Initial Patent Examination, and none of these figures includes either shading or unreadable text. Accordingly, this rejection is clear error.

Another rejection apparently based on the informal drawings initially filed with this application, instead of the formal drawings filed on August 26, 2002, was issued in the Office Action of January 11, 2005, and argued in the Response filed on April 1, 2005.

C. Rejection Under 35 U.S.C. § 102(b) Over U.S. Patent No. 6,260,024

1. Claims 1–15 and 27–41

The burden is on the Examiner to demonstrate that each feature of a claim is met by a reference or valid combination of references. The courts have repeatedly and consistently held

⁷ Specification at pg. 8, ln. 7–14.

that “all limitations [of a claim] must be considered ... and it is error to ignore specific limitations in distinguishing over the references.”⁸ In the present case, the Examiner has failed to consider essential elements of independent claims 1 and 27 in rejecting those claims and the claims that depend therefrom over United States Patent No. 6,260,024 to *Shkedy*.

Specifically, independent claims 1 and 27 both recite, in part: (1) “utilizing, by a programmed computer, the objective function to select a subset of suppliers and determine an optimal award schedule for at least partial satisfaction of said requisition utilizing the selected suppliers,” (2) where the “objective function” includes “non-price criteria,” and (3) the “optimal award schedule” includes information indicative of the manner in which each of said selected subset of suppliers is to at least partially satisfy said requisition (emphasis added). For the reasons that follow, we respectfully submit that *Shkedy* neither teaches nor suggests the use of non-price criteria in an objective function, or the determination of an optimal award schedule.

In accordance with claims 1 and 27, a prospective buyer specifies constraints that prospective suppliers are invited to satisfy. The buyer’s constraints may include traditional price terms, such as a maximum price per item, but also includes non-price terms (e.g., time to satisfaction, quality, quantity, etc.). Prospective suppliers submit bids responsive to the buyer’s constraints and the invention determines an optimal award schedule from those bids. In particular, the invention as claimed determines which of the bidding suppliers will optimally satisfy the bid, evaluating each bid against the price and non-price terms specified by the buyer. As explained in the specification, “[t]he optimal combination of suppliers, together with the list of items to be ordered from each supplier, is referred to as an optimal award schedule.”⁹ The “objective function” is the formulation of the buyer’s price and non-price constraints and the

⁸ *In re Boe and Duke*, 184 USPQ 38, 40 (CCPA 1974).

seller's constraints in its bid that is used by an optimization engine to determine the optimal award schedule.¹⁰

Shkedy, by contrast, describes a system for aggregating individual buyers' purchase requirements into a single collective purchase requirement, and providing that collective purchase requirement to sellers willing to bid on the collective purchase requirement.¹¹ *Shkedy* teaches a simple "winner-take-all" system, where one seller providing the best bid wins all of the business.¹²

Such a limited, even primitive system is simply not relevant to the present claims. Indeed, *Shkedy*, like other references cited during prosecution, typifies the prior art over which the present invention improves. The *Shkedy* system cannot create an "optimal award schedule" that allows multiple sellers to satisfy a buyer's requisition in an optimal fashion because a single buyer always wins the entire award. There is no notion, in *Shkedy*, of selecting a subset of suppliers and determining an optimal award schedule for at least partial satisfaction of a requisition utilizing the selected suppliers.

Moreover, while *Shkedy* allows prospective buyers to specify non-price criteria, such as a quantity, a pool date, and an outside delivery date,¹³ *Shkedy* does not appear to teach that a prospective seller may provide bids that do not conform to these non-price criteria, or how to weigh a prospective seller's non-conforming non-price criteria against a bid price. In other words, *Shkedy* cannot satisfy the requirements of the present claims that require an "objective function" including "non-price criteria" to create an optimal award schedule that is optimal with respect to both price and non-price criteria. In accordance with *Shkedy*, non-price requirements

⁹ Specification at pg. 2, ln. 4-6 (emphasis added).

¹⁰ *Id.* at pg. 25, ln. 27-p. 26, ln. 3.

¹¹ *Shkedy* at Abstract.

do no more than exclude a non-conforming bidder from consideration. Rather, the best price always wins so long as non-price criteria are not violated. This is flatly inconsistent with the claimed requirements of an optimal award schedule spread among multiple suppliers. It is even less relevant to an optimal award schedule that “includes information indicative of the manner in which each of said selected subset of suppliers is to at least partially satisfy said requisition.”

The rejection of independent claims 1 and 27 is solely based on *Shkedy*, and the preceding discussion demonstrates how *Shkedy* fails to satisfy at least two essential elements of these claims. For these reasons, we respectfully submit that the rejection of independent claims 1 and 27 over *Shkedy* is clear error. The remaining claims, which depend therefrom, are therefore allowable as well.

*D. Rejection Under 35 U.S.C. § 103(a) Over
 U.S. Patents Nos. 6,260,024 and 6,647,373*

I. Claims 16–26 and 42–52

These claims depend from independent claims 1 and 27. The preceding discussion demonstrates that these base claims are patentable. Claims 16–26 and 42–52, which depend from patentable base claims, are therefore allowable as well.

¹² *Id.* at col. 3, ln. 55-57; col. 3, ln. 9-11; col. 6, ln. 29-30.

¹³ *Shkedy* at col. 5, ln. 13-16.

CONCLUSION

For all of the foregoing reasons, we submit that the Examiner's rejections of claims 1–52 were erroneous, and reversal thereof is respectfully requested.

Respectfully submitted,

Date: April 10, 2009

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CLAIMS APPENDIX

1. A computer-implemented method for determining an optimal award schedule for at least partial satisfaction of a requisition, said method comprising:
 - receiving from a buyer, over a computer network, public buyer constraints representative of said requisition;
 - receiving from the buyer, over said computer network, a objective function including non-price criteria;
 - transmitting to a set of suppliers, over said computer network, said public buyer constraints;
 - receiving from each supplier, over said computer network, a bid responsive to said public buyer constraints; and
 - utilizing, by a programmed computer, the objective function to select a subset of suppliers and determine an optimal award schedule for at least partial satisfaction of said requisition utilizing the selected suppliers,
 - wherein said optimal award schedule includes information indicative of the manner in which each of said selected subset of suppliers is to at least partially satisfy said requisition.
2. The method of claim 1, wherein receiving said public buyer constraints from said buyer over said computer network comprises receiving a list of items to be supplied.
3. The method of claim 2, wherein receiving said list of items comprises receiving a list in which at least one item in said list is a logical item that includes a list of items.

4. The method of claim 1, wherein receiving said public buyer constraints from said buyer over said network comprises receiving a constraint selected from the group consisting of: a maximum price said buyer is willing to pay for at least partial satisfaction of said requisition; and a non-price constraint required by said buyer for at least partial satisfaction of said requisition.
5. The method of claim 4, wherein said non-price constraint is selected from the group consisting of: a desired time for at least partial satisfaction of said requisition; a desired quality for at least partial satisfaction of said requisition; and a desired quantity for at least partial satisfaction of said requisition.
6. The method of claim 1, wherein receiving said bid from each supplier over said computer network comprises receiving a bid including a proposed price for at least partial satisfaction of said requisition.
7. The method of claim 1, wherein receiving said bid from each supplier over said computer network comprises receiving a bid including a proposed price having a volume discount dependent on an extent to which said requisition is to be at least partially satisfied.
8. The method of claim 1, wherein receiving said bid from each supplier over said computer network comprises receiving a bid including a fixed charge independent of an extent to which said requisition is to be at least partially satisfied.
9. The method of claim 1, wherein receiving said bid from each supplier over said computer network comprises receiving a bundled bid offering to at least partially satisfy, for a bundled price, a requisition for a selection of items from said list of items.
10. The method of claim 1, further comprising facilitating an exchange of messages between a buyer and a supplier over said computer network.

11. The method of claim 10, further comprising facilitating the multi-casting of a message sent by said buyer to all suppliers over said computer network.
12. The method of claim 1, wherein determining an optimal award schedule comprises considering a performance attribute for a supplier.
13. The method of claim 12, wherein considering a performance attribute comprises selecting an attribute from the group consisting of: the supplier's reputation for prompt delivery, the supplier's reputation for quality, geographical location of the supplier, the supplier's reputation for support and maintenance, and a user-defined attribute.
14. The method of claim 12, wherein considering a performance attribute comprises considering a weight supplied by said buyer, said weight being indicative of an extent to which said performance attribute is to be considered in determining said optimal award schedule.
15. The method of claim 14, wherein considering a performance attribute comprises determining a price penalty on the basis of said weight and incorporating said price penalty in a bid received from said supplier.
16. The method of claim 1, wherein determining an optimal award schedule comprises applying a private buyer constraint.
17. The method of claim 16, wherein applying the private buyer constraint comprises applying a business rule.
18. The method of claim 17, wherein applying a business rule comprises selecting a business rule from the group consisting of: a business rule placing a limit on the number of selected suppliers, a business rule specifying properties of said selected suppliers, a business rule placing a limit on the number of items provided by a selected suppliers, a business rule placing a limit on

the number of items provided by a cluster of selected suppliers, and a business rule placing a limit on an extent to which a selected supplier at least partially satisfies said requisition.

19. The method of claim 18, wherein placing a limit comprises selecting a limit from the group consisting of an upper bound and a lower bound.

20. The method of claim 18, wherein the extent to which a selected supplier satisfies said requisition is measured by a monetary value of said extent.

21. The method of claim 16, wherein applying the private buyer constraint comprises rejecting any bundled bid.

22. The method of claim 16, wherein applying the private buyer constraint comprises manually selecting a supplier for inclusion in said list of selected suppliers.

23. The method of claim 22, wherein applying the private buyer constraint further comprises manually specifying an extent to which said manually selected supplier is to at least partially satisfy said requisition.

24. The method of claim 1, further comprising generating by a computer a code indicative of at least one reason for rejecting a losing bid.

25. The method of claim 24, wherein generating said code comprises incorporating into said code information indicative of whether said losing bid was rejected on the basis of a reason selected from a group consisting of an excessive price and an inadequate performance attribute.

26. The method of claim 1, further comprising selecting said requisition from the group consisting of: a purchase of an item, a purchase of a group of items, a performance of a service, and a performance of a group of services.

27. Computer-readable media having encoded thereon software for determining an optimal award schedule for at least partial satisfaction of a requisition, said software comprising:

instructions for receiving from a buyer, over a computer network, public buyer constraints representative of said requisition;

instructions for receiving from the buyer, over said computer network, a objective function including non-price criteria;

instructions for transmitting to a set of suppliers, over said computer network, said public buyer constraints;

instructions for receiving from each supplier, over said computer network, a bid responsive to said public buyer constraints;

instructions for utilizing the objective function to select a subset of suppliers and determine an optimal award schedule for at least partial satisfaction of said requisition utilizing the selected suppliers,

wherein said optimal award schedule includes information indicative of the manner in which each of said selected suppliers is to at least partially satisfy said requisition.

28. The computer-readable media of claim 27, wherein said instructions for receiving said public buyer constraints from said buyer over said computer network comprise instructions for receiving a list of items to be supplied.

29. The computer-readable media of claim 28, wherein said instructions for receiving said list of items comprise instructions for receiving a list in which at least one item in said list is a logical item that includes a list of items.

30. The computer-readable media of claim 27, wherein said instructions for receiving said public buyer constraints from said buyer over said network comprise instructions for receiving a

constraint selected from the group consisting of: a maximum price said buyer is willing to pay for at least partial satisfaction of said requisition; and a non-price constraint required by said buyer for at least partial satisfaction of said requisition.

31. The computer-readable media of claim 30, wherein said non-price constraint is selected from the group consisting of: a desired time for at least partial satisfaction of said requisition; a desired quality for at least partial satisfaction of said requisition; and a desired quantity for at least partial satisfaction of said requisition.

32. The computer-readable media of claim 27, wherein said instructions for receiving said bid from each supplier over said computer network comprise instructions for receiving a bid including a proposed price for at least partial satisfaction of said requisition.

33. The computer-readable media of claim 27, wherein said instructions for receiving said bid from each supplier over said computer network comprise instructions for receiving a bid including a proposed price having a volume discount dependent on an extent to which said requisition is to be at least partially satisfied.

34. The computer-readable media of claim 27, wherein said instructions for receiving said bid from each supplier over said computer network comprise instructions for receiving a bid including a fixed charge independent of an extent to which said requisition is to be at least partially satisfied.

35. The computer-readable media of claim 28, wherein said instructions for receiving said bid from each supplier over said computer network comprise instructions for receiving a bundled bid offering to at least partially satisfy, for a bundled price, a requisition for a selection of items from said list of items.

36. The computer-readable media of claim 27, wherein said software further comprises instructions for facilitating an exchange of messages between a buyer and a supplier over said computer network.

37. The computer-readable media of claim 36, wherein said software further comprises instructions for facilitating the multi-casting of a message sent by said buyer to all suppliers over said computer network.

38. The computer-readable media of claim 27, wherein said instructions for determining an optimal award schedule comprise instructions for considering a performance attribute for a supplier.

39. The computer-readable media of claim 38, wherein said instructions for considering a performance attribute comprise instructions for selecting an attribute from the group consisting of: the supplier's reputation for prompt delivery, the supplier's reputation for quality, geographical location of the supplier, the supplier's reputation for support and maintenance, and a user-defined attribute.

40. The computer-readable media of claim 38, wherein said instructions for considering a performance attribute comprise instructions for considering a weight supplied by said buyer, said weight being indicative of an extent to which said performance attribute is to be considered in determining said optimal award schedule.

41. The computer-readable media of claim 40, wherein said instructions for considering a performance attribute comprise instructions for determining a price penalty on the basis of said weight and incorporating said price penalty in a bid received from said supplier.

42. The computer-readable media of claim 27, wherein said instructions for determining an optimal award schedule comprise instructions for applying a private buyer constraint.

43. The computer-readable media of claim 42, wherein said instructions for applying private buyer constraint comprise instructions for applying a business rule.

44. The computer-readable media of claim 43, wherein said instructions for applying a business rule comprise instructions for selecting a business rule from the group consisting of: a business rule placing a limit on the number of selected suppliers, a business rule specifying properties of said selected suppliers, a business rule placing a limit on the number of items provided by a selected suppliers, a business rule placing a limit on the number of items provided by a cluster of selected suppliers, and a business rule placing a limit on an extent to which a selected supplier at least partially satisfies said requisition.

45. The computer-readable media of claim 44, wherein said instructions for placing a limit comprise instructions for selecting a limit from the group consisting of an upper bound and a lower bound.

46. The computer-readable media of claim 44, further comprising instructions for measuring the extent to which a selected supplier satisfies said requisition by measured by a monetary value of said extent.

47. The computer-readable media of claim 42, wherein said instructions for applying the private buyer constraint comprise instructions for rejecting any bundled bid.

48. The computer-readable media of claim 42, wherein said instructions for applying the private buyer constraint comprise instructions for enabling manual selection of a supplier for inclusion in said list of selected suppliers.

49. The computer-readable media of claim 48, wherein said instructions for applying the private buyer constraint further comprise instructions for enabling manual specification of an extent to which said manually selected supplier is to at least partially satisfy said requisition.

50. The computer-readable media of claim 27, wherein said software further comprises instructions for generating by a computer a code indicative of at least one reason for rejecting a losing bid.

51. The computer-readable media of claim 50, wherein said instructions for generating said code comprise instructions for incorporating into said code information indicative of whether said losing bid was rejected on the basis of a reason selected from a group consisting of an excessive price and an inadequate performance attribute.

52. The computer-readable media of claim 27, wherein said software further comprises instructions for selecting said requisition from the group consisting of: a purchase of an item, a purchase of a group of items, a performance of a service, and a performance of a group of services.

53. Cancelled.

EVIDENCE APPENDIX

There has been no evidence submitted under 37 C.F.R. §§ 1.130–32 in this case.

RELATED PROCEEDINGS APPENDIX

There have been no proceedings related to this case.

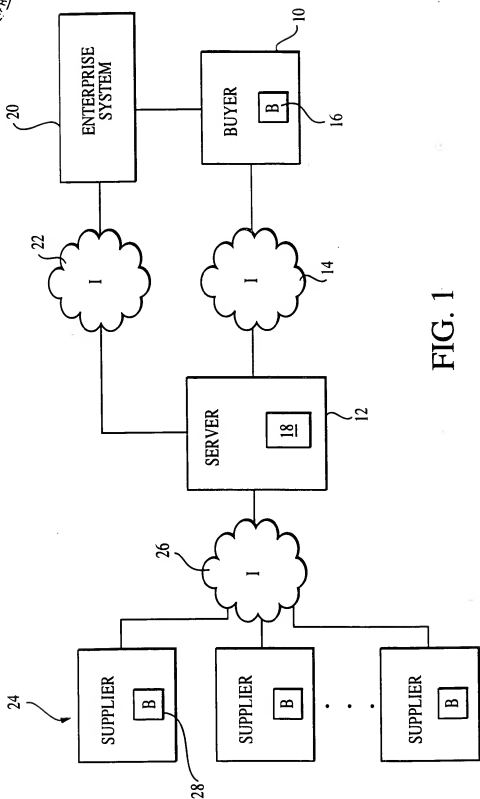


FIG. 1

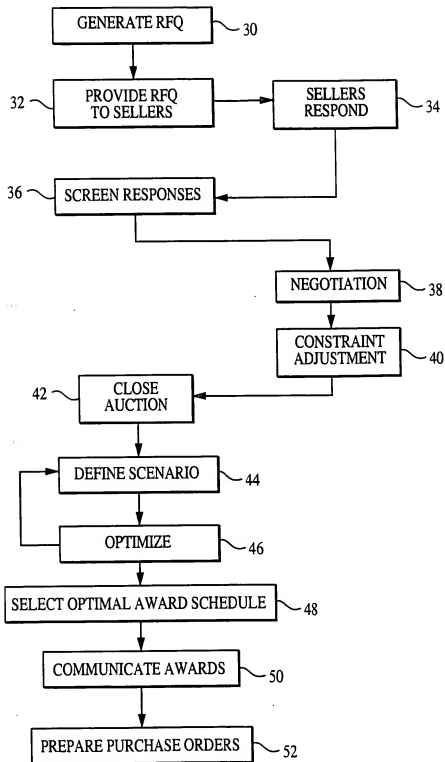


FIG. 2

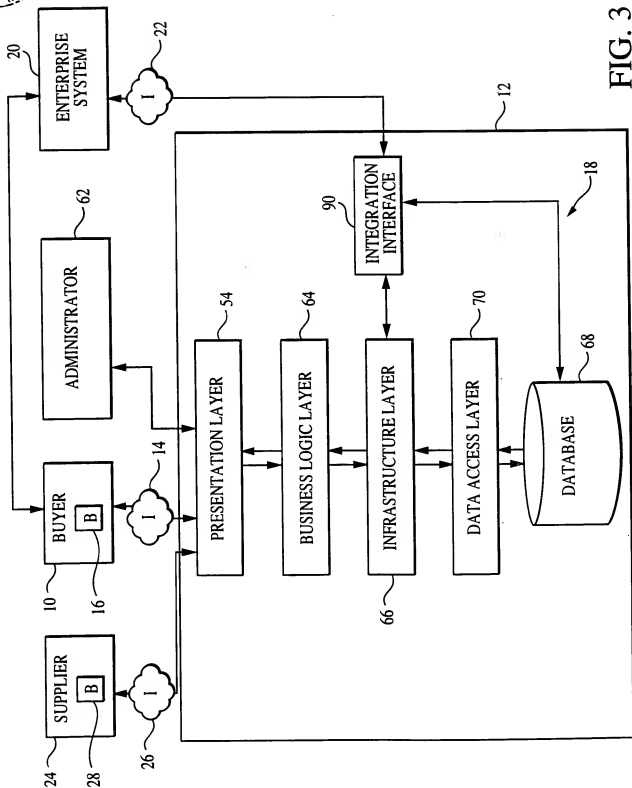
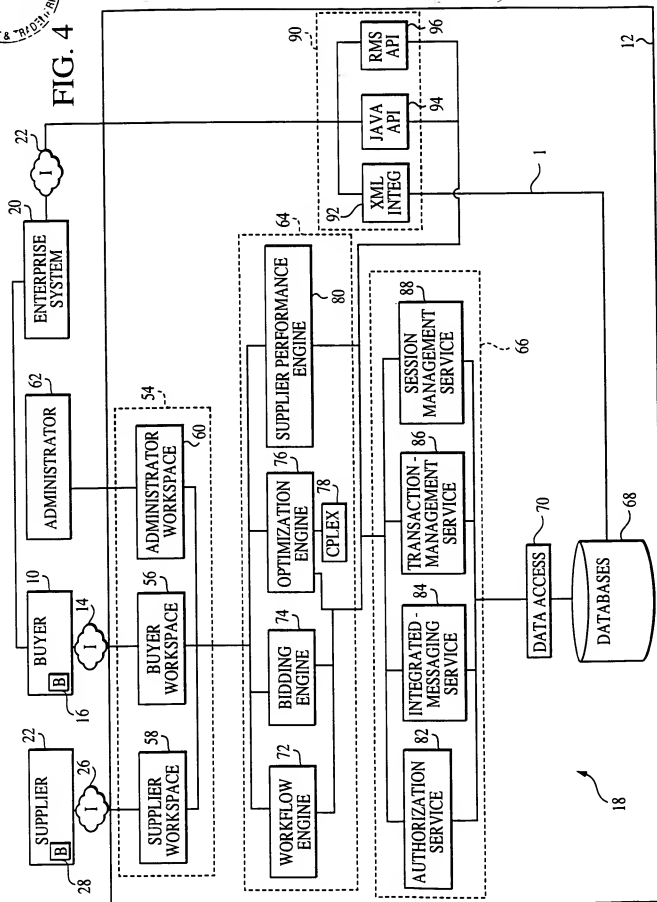


FIG. 3



FIG. 4



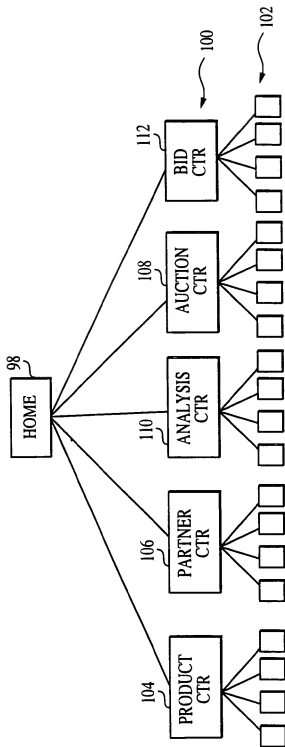



FIG. 5


ePass
electronic procurement application for strategic sourcing

[Buyer Home](#)
[Supplier Home](#)

Please fill in the following for (* indicating required fields):

Organization Information:	
Organization Type (*)	<input type="text" value="Seller"/>
Organization Name (*)	<input type="text" value="ABC Co."/>
Code (*)	<input type="text" value="ABCCO"/>
Description (*)	<input type="text" value="ABC Electronics"/>
URL (*)	<input type="text" value="http://www.doiil.com"/>

Default Organization User:

Login Name (*)	<input type="text" value="ABCSeller"/>
Name (*)	<input type="text" value="AI Tradings"/>
Email Address (*)	<input type="text" value="ai@bigbuy.com"/>
Fax Number	<input type="text" value=""/>
Phone Number (*)	<input type="text" value="123-123-1234"/>
Select Password (*)	<input type="text" value="..."/>
Re-enter password (*)	<input type="text" value="..."/>

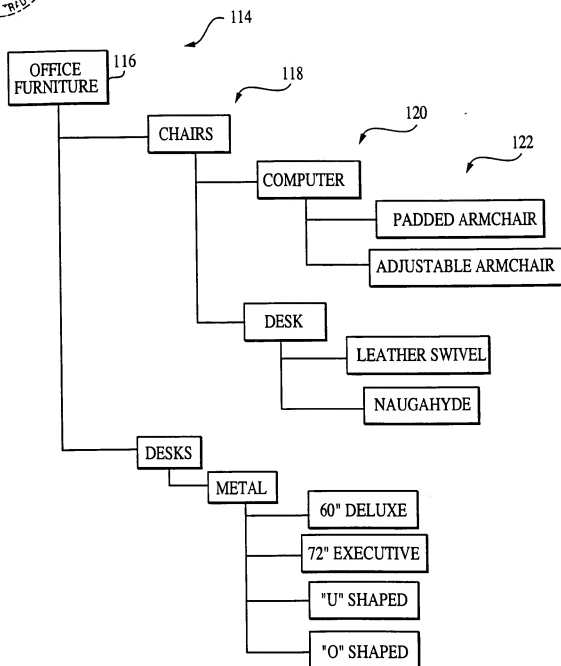



FIG. 7

FIG. 8



electronic procurement
application for
strategic sourcing

Buyer Home

Message Center

Manage Products

Configure Partners

Manage Auctions

View Bids

Analyze Bids

Logout

Help

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss

Address <http://qp03en/index.html> Go Link

Home > Auction Center > Auction: Electrical > Auction Configuration: Step 4: Bid Attributes

Step 1: Setup Auction	Step 2: Format Parameters	Step 3: Item Attributes	Step 4: Bid Attributes	Step 5: Bidders	Step 6: Notes	Auction Summary
<p>Auction: Electrical</p> <p>Please configure the information fields you would like Partners to provide as part of their bids. To add a new attribute, define the name in the text box and click Add Attribute. To delete an attribute from the list, check-select the item and click Delete Attribute.</p> <div> <input type="checkbox"/> Warranty Days </div> <div> <div>Bid Parameters</div> <div> <div>New Attribute Name:</div> <div>Add Attribute</div> <div>Delete Attributes</div> </div> </div>						

FIG. 9

ePass - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss Go Link >>

Address http://qa03enindex.html

Home > Partner Center > Category Rating > Category Rating Edit

Partner: ABC Traders
Category: Electronics

Edit Partner Category Rating

The following are the Participant performance factor ratings for category Electronics
To modify, make changes in the form and click **Save**.
Valid values are from 1 to 100 (Worst to Best).

Name	Code	Description	Default Value	Partner Rating
Quality	Q1	Quality Rating	50	96

electronic procurement application for strategic sourcing

ePass

-
-
-
-
-
-
-
-

Done Local intranet



FIG. 10

ePass - Microsoft Internet Explorer									
File Edit View Favorites Tools Help									
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit W Discuss Dell Home Go Link									
Address http://qa03/en/index.html									

Home > Auction Center

View Created Auctions

View Pending Auctions

View Open Auctions

View Closed Auctions

View Awarded Auctions

Import/Export

The following is the list of Created Auctions you have offered or currently offering. Click on the Auction id or description to bring up the Auction status report. Click on the action links for other Auction features.

	Name	Type	Open	Closed	Actions
<input type="checkbox"/>	<u>Supplies</u>	Dutch			Open Auction
<input type="checkbox"/>	<u>Electrical</u>	Sealed			Open Auction
<input type="checkbox"/>	<u>test1</u>	Sealed			Open Auction
<input type="checkbox"/>	<u>AXSAuction.1</u>	Dutch			Open Auction

1-4 of 4

Create New Auction
Cancel Selected Auctions

ePass

electronic procurement application for strategic sourcing

- Buyer Home
- Message Center
- Manage Products
- Configure Partners
- Manage Auctions
- View Bids
- Analyze Bids
- Logout

[Help](#)



FIG. 11

ePass - Microsoft Internet Explorer	File Edit View Favorites Tools Help			Stop	Refresh	Home	Search	Favorites	History	Mails	Print	Edit	Discuss	Dell Home		Link >>	
				http://qd03en/index.html													

electronic procurement application for strategic sourcing

ePass

Buyer Home	Message Center	Manage Products	Configure Partners	Manage Auctions	View Bids	Analyze Bids	Logout
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Home > Auction Center > Supplies

Auction Dates

Open Auction for bidding

Populate the dates below to specify the opening and closing time of the auction. When done, click **Open Later** to update the database. Click **Cancel** to cancel any changes. The **Now** buttons will put today's date into the corresponding date selection lists.
Click **Open Right Now** to open the auction immediately.

The following rules apply:

- An auction can NOT be started if:
 - You do not have management privileges.
 - There are no requisitions or items defined for the auction.
 - If the auction is a sealed type and there are no Participants approved for the auction.
- Opening date can not be modified if the auction has already started.
- Closing date does not have to be specified.
- The closing date cannot be before the opening date.

Month		Day		Year		Hour		Minute	
Open Date	May	11	>	2000	>	12	>	00	>
Close Date	Jun	11	>	2000	>	12	>	00	>

Open Later Cancel Open Right Now

Help



FIG. 14

[Back](#)
[Forward](#)
[Stop](#)
[Refresh](#)
[Home](#)
[Search](#)
[Favorites](#)
[History](#)
[Mail](#)
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[http://qp03tenindex.html](#)

[ePass](#)
 electronic procurement
 application for
 strategic sourcing

[Supplier Home](#)
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[Logouts](#)

[View Bids](#)
 The following are the current bids for this item.
 0 of 0

Enter the price per Unit and any other fields before clicking the Submit button:



FIG.
15A

ePass - Microsoft Internet Explorer File Edit View Favorites Tools Help Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss Address: http://qa03en/index.html		Home > Bid Center > Auction Supplies2 > Requisition: Req_1 > Item: Pencils	
Auction Info		Auction Name: Supplies2 Auction Status: Open Auction Type: Dutch Show All Bidders: No Start Date: 05/11/2000 15:48 End Date: 07/11/2000 16:00	
Item Details		Product Category: sshcat1 Name: Pencils Code: PEN101 Description: # 2 Pencils Minimum Desired Quantity: 1,000 Maximum Desired Quantity: Price Quote Unit: Lot Size: Required Delivery Date:	
Buyer Home Message Center Manage Products Configure Partners Manage Auctions View Bids Analyze Bids Logout		Reserved Price Historical Price Minimum Bid Quantity: 0 Maximum Bid Quantity:	
electronic procurement application for strategic sourcing ePass		Lowest Bid Bidder: 7 Max Bid Quantity: 1,000 Price Per Unit: \$0.05 Highest Bid Allowed: \$0.04	
Help		View Bids	
The following are the current bids for this item.			
Done Local intranet			



FIG.
15B

<p>Back Forward Stop Refresh Home Search Favorites History Mail Discuss Edit Print</p> <p>Address: http://aqd3ten/index.html</p>		<p>05/11/2000 15:48 07/11/2000 16:00</p>																																				
<p>Item Details</p> <table border="1"> <tr> <td>Product Category</td> <td>sshcat1</td> <td>Reserved Price</td> </tr> <tr> <td>Name</td> <td>Pencils</td> <td>Historical Price</td> </tr> <tr> <td>Code</td> <td>PEN101</td> <td>Minimum Bid Quantity</td> </tr> <tr> <td>Description</td> <td># 2 Pencils</td> <td>Maximum Bid Quantity</td> </tr> <tr> <td>Minimum Desired Quantity</td> <td>1,000</td> <td></td> </tr> <tr> <td>Maximum Desired Quantity</td> <td></td> <td></td> </tr> <tr> <td>Price Quote Unit</td> <td></td> <td></td> </tr> <tr> <td>Lot Size</td> <td></td> <td></td> </tr> <tr> <td>Required Delivery Date</td> <td></td> <td></td> </tr> </table>		Product Category	sshcat1	Reserved Price	Name	Pencils	Historical Price	Code	PEN101	Minimum Bid Quantity	Description	# 2 Pencils	Maximum Bid Quantity	Minimum Desired Quantity	1,000		Maximum Desired Quantity			Price Quote Unit			Lot Size			Required Delivery Date			<p>Lowest Bid</p> <table border="1"> <tr> <td>Bidder</td> <td>7</td> </tr> <tr> <td>Max Bid Quantity</td> <td>1,000</td> </tr> <tr> <td>Price Per Unit</td> <td>\$0.05</td> </tr> <tr> <td>Highest Bid Allowed</td> <td>\$0.04</td> </tr> </table>		Bidder	7	Max Bid Quantity	1,000	Price Per Unit	\$0.05	Highest Bid Allowed	\$0.04
Product Category	sshcat1	Reserved Price																																				
Name	Pencils	Historical Price																																				
Code	PEN101	Minimum Bid Quantity																																				
Description	# 2 Pencils	Maximum Bid Quantity																																				
Minimum Desired Quantity	1,000																																					
Maximum Desired Quantity																																						
Price Quote Unit																																						
Lot Size																																						
Required Delivery Date																																						
Bidder	7																																					
Max Bid Quantity	1,000																																					
Price Per Unit	\$0.05																																					
Highest Bid Allowed	\$0.04																																					
<p>View Bids</p> <p>The following are the current bids for this item. 1-3 of 3</p> <table border="1"> <thead> <tr> <th>Bidder</th> <th>Organization</th> <th>Bid Type</th> <th>Bundle Code*</th> <th>Max Bid Quantity</th> <th>Price Per Unit</th> </tr> </thead> <tbody> <tr> <td>Harry Sales</td> <td>ABC Co</td> <td>Single Item Bid</td> <td></td> <td>1,000</td> <td>\$0.05</td> </tr> <tr> <td>Ed Catton</td> <td>BestDeal</td> <td>Single Item Bid</td> <td></td> <td>1,000</td> <td>\$0.05</td> </tr> <tr> <td>Boe Cheaper</td> <td>Surfin' Seller</td> <td>Single Item Bid</td> <td></td> <td>1,000</td> <td>\$0.06</td> </tr> </tbody> </table>		Bidder	Organization	Bid Type	Bundle Code*	Max Bid Quantity	Price Per Unit	Harry Sales	ABC Co	Single Item Bid		1,000	\$0.05	Ed Catton	BestDeal	Single Item Bid		1,000	\$0.05	Boe Cheaper	Surfin' Seller	Single Item Bid		1,000	\$0.06	<p>Done</p>												
Bidder	Organization	Bid Type	Bundle Code*	Max Bid Quantity	Price Per Unit																																	
Harry Sales	ABC Co	Single Item Bid		1,000	\$0.05																																	
Ed Catton	BestDeal	Single Item Bid		1,000	\$0.05																																	
Boe Cheaper	Surfin' Seller	Single Item Bid		1,000	\$0.06																																	

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Logout

Help



FIG. 16A

ePass - Microsoft Internet Explorer File Edit View Favorites Tools Help Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss Deal Home Address: http://qa3clev/index.html		Home > Bid Center > Auction: Electrical > Requisition:real > Item: 30 AMP Breakers Auction Info	
Auction Name: Electrical Auction Status: Open Auction Type: Sealed Show All Bidders: No Start Date: 05/11/2000 14:25 End Date: 07/11/2000 14:30		Item Details Product Category: sshcat1 Name: 30 AMP Breakers Code: BK30A101 Description: 30 AMP Circuit Breaker Minimum Desired Quantity: 40 Maximum Desired Quantity: Price Quote Unit: Lot Size: Required Delivery Date:	
Buyer Home Message Center Manage Products Configure Partners Manage Auctions View Bids Analyze Bids Logout		View Bids The following are the current bids for this item. 1-5 of 5	
Bidder: Harry Sales Organization: ABC Co Bid Type: Single Item Bid:		Bundle Code*: Min Bid Quantity: 40 Max Bid Quantity: 100 Price Per Unit: \$5.00 One Time Charge: \$0.00	
Bid:		Bid:	
Done		Done	

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ePass



FIG. 16B

ePass - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss Dial Home
Address http://pat3/en/index.html

SHOW ALL BIDDERS NO
Start Date 05/11/2000 14:25
End Date 07/11/2000 14:30

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Item Details
Product Category sshcat1
Name 30 AMP Breakers
Code BK30A101
Description 30 AMP Circuit Breaker
Minimum Desired Quantity 40
Maximum Desired Quantity
Price Quote Unit
Lot Size
Required Delivery Date
Reserved Price
Historical Price
Minimum Bid Quantity 0
Maximum Bid Quantity
Tolerances

View Bids
The following are the current bids for this item.
1-5 of 5

Bidder	Organization	Bid Type	Bundle Code*	Min Bid Quantity	Max Bid Quantity	Price Per Unit	One Time Charge
Harry Sales	ABC Co	Single Item Bid		40	100	\$5.00	\$0.00
Ed Catlion	BestDeal	Single Item Bid		20	20	\$4.00	\$1.00
Boa	Surfin' Seller	Single Item Bid		1	10	\$5.50	\$0.00
Cheaper	Surfin' Seller	Single Item Bid		11	30	\$5.00	\$0.00
Boa	Surfin' Seller	Single Item Bid		31	50	\$3.50	\$0.00
Cheaper	Surfin' Seller	Single Item Bid					

ePass - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss Dell Home

Address http://qd31en/index.html

Required Delivery Date

View Bids

The following are the current bids for this item.

Bidder	Bid Type	Min Bid Quantity	Max Bid Quantity	Price Per Unit	One Time Charge
Enter Bid for the Item					
Enter the Price per Unit and any other fields before clicking the Submit button:					
Partner Product Code	ABKR01				
Comment					
Warranty Days	60				
	Minimum		Maximum		One Time Charge
Volume Bid Set 1	1		10	5.50	
Volume Bid Set 2	11		30	5.00	
Volume Bid Set 3	31		50	3.50	
Save Cancel					

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FIG. 17



ITEM	QTY DESIRED	BID 1 ABC CO.	BID 2 BESTDEAL	BID 3 SURFIN
2x4x8	400	400 1.25	400 1.25	400
2x12x10	1000	1000 5.00	1000 4.50	1000
PW 4x8x1/2	100	100 25.00	100 25.00	100
<u>BUNDLED @ \$7350</u>				

FIG. 18



FIG. 20A

ePass - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss Dell Home
Address http://qap3/en/index.html

Home > Bid Center > RFQ: Construction > Requisition:REQ1 > Create Bundled Bid

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Auction Info

Auction Name	Construction
Auction Status	Open
Auction Type	Sealed
Show All Bidders	No
Start Date	05/11/2000 14:31
End Date	07/11/2000 14:30

Create Bundled Bid

Enter the product Quantity per Bundle, Price per Bundle, and any other fields before clicking the Submit button:

Bundle Description:	Bundle of Materials
Seller Bundle Code	Bundled bid for Req. 1 of Construction RFQ
Comment	

Bundle Composition:

Buyer		Seller	
Line Item	Name	Desired Quantity	Quantity per Bundle
020408	2 x 4 x 8	400	400
021210	2 x 12 x 20	1,000	1000
0406005	PW 4 x 8 x 1/2	100	100

Help



FIG. 20B

ePass - Microsoft Internet Explorer File Edit View Favorites Tools Help Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss Dell Home Address http://qa03en/index.html		Auction type: Sealed Show All Bidders No Start Date 05/11/2000 14:31 End Date 07/11/2000 14:30	
Create Bundled Bid Enter the product Quantity per Bundle, Price per Bundle, and any other fields before clicking the Submit button:			
Bundle Description: Bundle of Materials Bundled bid for Req 1 of Construction RFQ		Seller Bundle Code Comment	
Bundle Composition:		Seller	
Line Item	Name	Desired Quantity	Quantity per Bundle
020408	2 x 4 x 8	400	021190
021210	2 x 12 x 10	1,000	090121
0406005	PW 4 x 8 x 1/2	100	902019
Bundle Pricing:		Cost	
Number of Bundles		Price per Bundle	
Minimum		One-Time Charge	
1		7350	
Save		Cancel	

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ePass



FIG. 21

ePass - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss Dell Home Go Link >>

Address http://qa03/en/index.html

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- Buyer Home
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- Analyze Bids
- Logout

Home > Analyze Bids Center

Auction: Electrical

Change Auction
Electrical

Scenarios Schedules

The following are the scenarios created for Auction Electrical

Id	Name	Coverage	Purchasing Cost (000's)	System Cost (000's)	Perf. Ratio	Actions
No scenarios defined						

Create Scenario
Delete Scenario

Done Local Internet



FIG. 22

Home > Analyze Bids Center > New Scenario

Auction: Electrical
Scenario:

New Scenario

Please fill in the following information for the scenario.

Name			
Description			
Recommend Secondary Vendors		Lowest Total Cost	
Number of Secondary Vendors	2		
Rules		<input checked="" type="checkbox"/> Manual Awards <input checked="" type="checkbox"/> Business Rules <input checked="" type="checkbox"/> Bundles	

Performance Factor Weightings

Price	150.00%
Add Factor	Select a Factor ▼

Save

Cancel

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FIG. 23

[Home](#) > [Analyze Bids](#) > [Business Rules](#)

1 of 1


Auction: Electrical
 Scenario: Price Only

[Setup](#) [Manual Awards](#) [Business Rules](#)

The following is a list of business rules defined for scenario Price Only on Auction Electrical

Type	Name	Scope	Partner	Min	Max	Actions
<input type="checkbox"/>	Capacity	BR Quantity Limit	RFQ	Each Partner	50%	Wizard

[Create Rule](#) [Delete Rules](#)



ePass


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FIG. 24

<p>  ePass - Microsoft Internet Explorer </p>		<p> File Edit View Favorites Tools Help </p>	
<p> Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss Deil Home </p>		<p> Go Link </p>	
<p>Address: http://www3enlindex.html</p>			

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ePass

Business Rule Wizard (Step 1 of 4)

Please name the rule	BR Quantity Limit	Limit Vendors to no more than 50% of Bid	<input type="radio"/> Yes <input checked="" type="radio"/> No
Please give a short description	BRQTY		
Please give a long description			
Do you want to ignore the rule for now?			

Please specify the type of rule

Award business to a preferred Partner of place a limit on the amount of business a Partner is awarded.

☒ Capacity

☐ Vendor Count

☐ Cost

☐ Performance Cost

Please specify the type of rule

Award business to a preferred Partner of place a limit on the amount of business a Partner is awarded.

Limit the number of Partners that receive awards

Limit the purchasing cost (excluding performance based costs)

Limit the total purchasing cost (including performance based costs)

Next >>

Cancel

Help



FIG. 25

<p> <input type="button" value="Back"/> <input type="button" value="Forward"/> <input type="button" value="Stop"/> <input type="button" value="Refresh"/> <input type="button" value="Home"/> <input type="button" value="Search"/> <input type="button" value="Favorites"/> <input type="button" value="History"/> <input type="button" value="Mail"/> <input type="button" value="Print"/> <input type="button" value="Edit"/> <input type="button" value="Discuss"/> <input type="button" value="Del"/> <input type="button" value="Home"/> <input type="button" value="Go"/> <input type="button" value="Link"/> </p>	
<p> <input type="button" value="ePass - Microsoft Internet Explorer"/> <input type="button" value="File"/> <input type="button" value="Edit"/> <input type="button" value="View"/> <input type="button" value="Favorites"/> <input type="button" value="Tools"/> <input type="button" value="Help"/> </p>	
<p>Address: http://qa031en/index.html</p>	

Business Rule Wizard (Step 2 of 4)

Name	BR Quantity Limit
Short Description	BRQTY
Long Description	Limit Vendors to no more than 50% of Bid
Ignore For Now?	No
Type	Capacity

Please specify the scope of the rule

☒ Auction
☐ Requisition
☐ Category
☐ Item

Apply across the entire Auction
 Apply only to the specified requisition.
 Apply only to the specified category
 Apply only to the specified item

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FIG. 26

ePass - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://qa03en/index.html>

Business Rule Wizard (Step 3 of 4)

Name	BR Quantity Limit
Short Description	BRQTY
Long Description	Limit Vendors to no more than 50% of Bid
Ignore For Now?	No
Type	Capacity
Scope	RFO

Please specify the Partner affected by the rule

Apply the rule to the selected Partner.



FIG. 27

ePass - Microsoft Internet Explorer File Edit View Favorites Tools Help Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss Dell Home Address http://qa3tenindex.html		[Link] [Go] [Back] [Forward] [Stop] [Refresh] [Home] [Search] [Favorites] [History] [Mail] [Print] [Edit] [Discuss] [Dell Home]	
Business Rule Wizard (Step 4 of 4)			
Name Short Description Long Description Ignore For Now? Type Scope Partner		BR Quantity Limit BRQTY Limit Vendors to no more than 50% of Bid No Capacity RFQ Each Partner	
Please specify the minimum and/or maximum value that should be awarded			
Select the units the minimum/maximum value are specified in		Specify this value if you require the Partner to be awarded a certain amount. You can leave this field blank if there is no required minimum. For percentage, specify 0.5 for 50%	
Minimum Amount to Award		Specify this value if you want to limit the maximum amount awarded to the organization. You can leave this field blank if there is no maximum. For percentage, specify 0.5 for 50%	
Maximum Amount to Award		Specify this value if you want to limit the maximum amount awarded to the organization. You can leave this field blank if there is no maximum. For percentage, specify 0.5 for 50%	
Buyer Home Message Center Manage Products Configure Partners Manage Auctions View Bids Analyze Bids Logout		<< Back Finish Cancel Done Local Intranet	

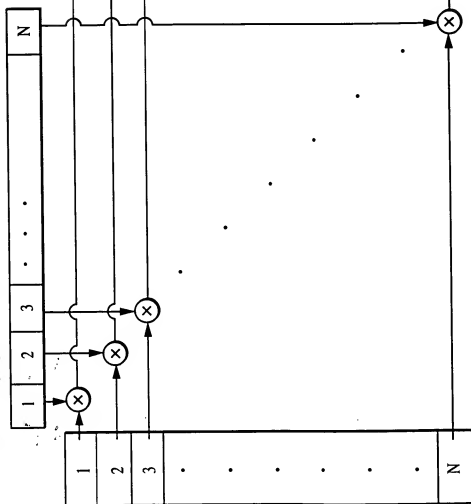


FIG. 28

ePass																	
<p>Home > Analyze Bids Center > Setup > Edit Scenario</p> <p>Auction: Electrical Scenario: Scene Quality</p> <p>Please fill in the following information for the scenario.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Name</th> <th>Scene Quality</th> </tr> </thead> <tbody> <tr> <td>Description</td> <td>Price/Quality Analysis</td> </tr> <tr> <td>Recommend Secondary Vendors</td> <td>Lowest Total Cost</td> </tr> <tr> <td>Number of Secondary Vendors</td> <td>2</td> </tr> <tr> <td>Rules</td> <td> <input checked="" type="checkbox"/> Manual Awards <input checked="" type="checkbox"/> Business Rules <input checked="" type="checkbox"/> Bundles </td> </tr> </tbody> </table> <p>Performance Factor Weightings</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Factor</th> <th>Weighting</th> </tr> </thead> <tbody> <tr> <td>Price</td> <td>100.00%</td> </tr> <tr> <td>Quality</td> <td>50.00%</td> </tr> </tbody> </table> <p style="text-align: right;"> <input type="button" value="Save"/> <input type="button" value="Cancel"/> </p>	Name	Scene Quality	Description	Price/Quality Analysis	Recommend Secondary Vendors	Lowest Total Cost	Number of Secondary Vendors	2	Rules	<input checked="" type="checkbox"/> Manual Awards <input checked="" type="checkbox"/> Business Rules <input checked="" type="checkbox"/> Bundles	Factor	Weighting	Price	100.00%	Quality	50.00%	<p>electronic procurement application for strategic sourcing</p> <p style="text-align: center;"></p> <p>Buyer Home</p> <p>Message Center</p> <p>Manage Products</p> <p>Configure Partners</p> <p>Manage Auctions</p> <p>View Bids</p> <p>Analyze Bids</p> <p>Logout</p> <p>Help</p>
Name	Scene Quality																
Description	Price/Quality Analysis																
Recommend Secondary Vendors	Lowest Total Cost																
Number of Secondary Vendors	2																
Rules	<input checked="" type="checkbox"/> Manual Awards <input checked="" type="checkbox"/> Business Rules <input checked="" type="checkbox"/> Bundles																
Factor	Weighting																
Price	100.00%																
Quality	50.00%																



BUYER DEFINED
 SCENARIO WEIGHTS



PERFORMANCE
 ATTRIBUTES
 FROM DATABASE

FIG. 29



$$\sum_{s \in S} \left\{ \sum_{b(s) \in B(s)} \left[f_l^{b(s)} X^{b(s)} + C_l^{b(s)} x_l^{b(s)} \right] + \sum_{d(s) \in D(s)} f^{d(s)} \sum_{i \in d(s)} Z^{d(s)} + C_l^{d(s)} Z_l^{d(s)} \right\} +$$

$$\sum_{k \in K} \sum_{j \in I} W_{k,i} \left\{ \sum_{s \in S} \left(\frac{100 - T_{k,i}^s}{100} \right) \left[\sum_{b(s) \in B(s)} C_l^{b(s)} x_l^{b(s)} + \sum_{d(s) \in D(s)} C_l^{d(s)} Z_l^{d(s)} \right] \right\}$$

FIG. 30

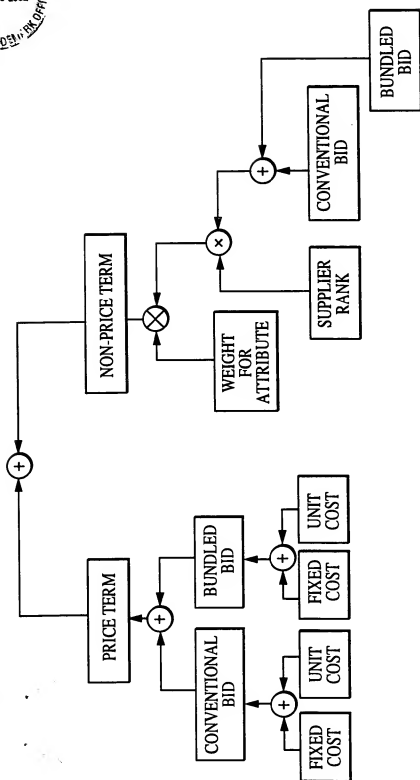


FIG. 31



$$\sum_{s \in S} \left(\sum_{b(s) \in B(s)} x_i^{b(s)} + \sum_{d(s) \in D(s)} z_i^{d(s)} \right) \leq Q_i^u \quad \forall i \in I \quad (1)$$

$$\sum_{s \in S} \left(\sum_{b(s) \in B(s)} x_i^{b(s)} + \sum_{d(s) \in D(s)} z_i^{d(s)} \right) \geq Q_i^l \quad \forall i \in I \quad (2)$$

$$\sum_{i \in g} \left(\sum_{b(s) \in B(s)} x_i^{b(s)} + \sum_{d(s) \in D(s)} z_i^{d(s)} \right) - Y_g^s M_g \leq 0 \quad \begin{matrix} \forall s \in S \\ \forall g \in G \end{matrix} \quad (3)$$

$$\sum_{i \in g} \left(\sum_{b(s) \in B(s)} x_i^{b(s)} + \sum_{d(s) \in D(s)} z_i^{d(s)} \right) - Y_g^s \geq 0 \quad \begin{matrix} \forall s \in S \\ \forall g \in G \end{matrix} \quad (4)$$

$$\sum_{s \in T} Y_g^s \leq \text{Max } Ng^t \quad \forall g \in G, \quad \forall t \in T \quad (5)$$

$$\sum_{s \in T} Y_g^s \geq \text{Min } Ng^t \quad \forall g \in G, \quad \forall t \in T \quad (6)$$

FIG. 32



$$\sum_{s \in I} \sum_{i \in g} \left(\sum_{b(s) \in B(s)} x_i^{b(s)} + \sum_{d(s) \in D(s)} z_i^{d(s)} \right) \leq \text{Max } Q_g^i \quad \forall g \in G, \forall i \in T \quad (7)$$

$$\sum_{s \in I} \sum_{i \in g} \left(\sum_{b(s) \in B(s)} x_i^{b(s)} + \sum_{d(s) \in D(s)} z_i^{d(s)} \right) \geq \text{Min } Q_g^i \quad \forall g \in G, \forall i \in T \quad (8)$$

$$\sum_{s \in I} \sum_{i \in g} \left(\sum_{b(s) \in B(s)} c_i^{b(s)} x_i^{b(s)} + \sum_{d(s) \in D(s)} c_i^{d(s)} z_i^{d(s)} \right) \leq \text{Max } V_g^i \quad \forall g \in G, \forall i \in T \quad (9)$$

$$\sum_{s \in I} \sum_{i \in g} \left(\sum_{b(s) \in B(s)} c_i^{b(s)} x_i^{b(s)} + \sum_{d(s) \in D(s)} c_i^{d(s)} z_i^{d(s)} \right) \geq \text{Min } V_g^i \quad \forall g \in G, \forall i \in T \quad (10)$$

FIG. 33



$$(11) \quad Z_i^{d(s)} - u_i^{d(s)} Z^{d(s)} \leq 0 \quad \forall i \in I, \forall s \in S, \forall b(s) \in B(s)$$

$$(12) \quad Z_i^{d(s)} - l_i^{d(s)} Z^{d(s)} \geq 0 \quad \forall i \in I, \forall s \in S, \forall b(s) \in B(s)$$

$$(13) \quad X_i^{b(s)} - X^{b(s)} U_i^{b(s)} \leq 0 \quad \forall s \in S, \forall b(s) \in B(s)$$

$$(14) \quad X_i^{b(s)} - X^{b(s)} L_i^{b(s)} \geq 0 \quad \forall s \in S, \forall b(s) \in B(s)$$

$$(15) \quad 0 \leq X_i^{b(s)} \leq U_i^{b(s)} \quad \forall s \in S, \forall b(s) \in B(s)$$

$$(16) \quad 0 \leq Z_i^{d(s)} \quad \forall d(s) \in D(s)$$

$$(17) \quad X^{b(s)} = \begin{cases} 0 \\ 1 \end{cases} \quad \forall b(s) \in B(s)$$

$$(18) \quad Y_g^s = \begin{cases} 0 \\ 1 \end{cases} \quad \forall g \in G, \forall s \in S$$

$$(19) \quad Z_g^s = \begin{cases} 0 \\ 1 \end{cases} \quad \forall g \in G, \forall s \in S$$

FIG. 34



```

if  $O < O^*$  then
    indicator = C
else if  $p \geq p^*$ 
{
    if  $[O - p \geq O^*]$ 
        indicator = F
    else
        indicator = P
}
else
    indicator = F
    
```

```

if  $p > p^*$  then
    indicator = P
else if  $O > O^*$  then
    indicator = F
else
    indicator = C
    
```

FIG. 35



```
if ( $O < O^*$ )  
    indicator = C;  
else if ( $p \geq \text{ALL}(p^i)$ )  
    {  
        if ( $(O - p) \geq \text{ALL}(O^i)$ )  
            indicator = F;  
        else  
            indicator = P;  
    }  
else  
    indicator = F
```

FIG. 36



```
if ( $O < O^*$ )
    indicator = C;
else if ( $O > \text{ALL}(O^i)$ )
{
    if ( $p < p^*$ )
        indicator = F;
    else if ( $((O - p) \geq \text{ALL}(O^i))$ )
        indicator = F;
    else if ( $p > \text{ALL}(p^j)$ )
    {
        if ( $R > \text{ALL}(R^i)$ )
            indicator = PF;
        else
            indicator = P;
    }
    else
        indicator = F;
}
else
{
    if ( $p < p^*$ )
        indicator = FC;
    else if ( $R < R^*$ )
        indicator = PC;
    else
        indicator = PFC;
}
```

FIG. 37